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發明專利說明書
~~新型~~

一、發明 新型 名稱	中 文	電話遙控有線電視網際網路系統
	英 文	
二、發明人 創作	姓 名	李仁貴
	國 籍	中華民國
	住、居所	台北縣土城鄉學府路一段164巷6弄4號
三、申請人	姓 名 (名稱)	李仁貴
	國 籍	中華民國
	住、居所 (事務所)	台北縣土城鄉學府路一段164巷6弄4號
	代 表 人 姓 名	

四、中文發明摘要（發明之名稱：電話遙控有線電視網際網路系統）

一種電話遙控有線電視網際網路系統，主要係在有線電視的訂戶端，以按鍵式電話機之按鍵模擬電腦滑鼠或電腦鍵盤之功能，經由電話網路遙控位於有線電視頭端的網際網路主機；而能擷取遍佈全世界的網際網路資源。至於該網際網路主機的顯像器畫面訊號則是經過有線電視頭端的調變處理後，由有線電視網路傳送至訂戶的電視機上。若有線電視公司安裝此系統，則該公司的訂戶只要使用其電話和電視機就可擷取網際網路的全球資訊服務；就如同使用個人電腦設備及數據機擷取網際網路服務一般。

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英文發明摘要（發明之名稱：）

五、發明說明 (1)

1. 發明背景

網際網路是去年全球資訊界最熱門的話題。大多數的資訊專家一致認為網際網路將成為全球資訊高速公路的促成人。目前網際網路已經被視為是讓開發中國家進入全球資訊體系的廉價方式，不過在通信政策壟斷及一些政府的反對下，網際網路仍舊價格過高或是無法滲入某些地區。根據估計，現在全球每天總計有超過一百四十六個國家三百萬台電腦系統可接受網際網路提供的讀取資料服務。網際網路的使用者已超過三千一百萬，且持續以非常驚人的速度擴增中。

生活在二十世紀的我們，絕對迴避不了網際網路的影響，舉凡教育、學術研究、購物、娛樂、旅遊、交通、金融、藝術、新聞、通信等等都可藉由網際網路達到很好的便利性與實用性。可惜的是，雖然現代人眼裡看網際網路畫面、耳中聽網際網路訊息、嘴裡也談網際網路話題。但是大多數人並沒有上網路一窺究竟的經驗，因為上網路必須要有基本配備，除了申請一個網路帳號，還要有個人電腦及數據機(Modem)等硬體設備。此外，學習網際網路的操作也必須有專家指導才能得心應手。

一個重要的事實是大多數人並不會為了一睹網際網路的迷人風采就動用五萬至十萬元的預算去買一套網際網路的電腦及其相關設備。這也是形成一個國家其

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個人電腦數目愈多，網際網路人口也愈多的主要原因。亦即，網際網路的發展必然受到個人電腦普及率的限制。很幸運地，本發明可以打破這種限制。一般民眾不必買個人電腦，只要是有線電視的訂戶，利用家中的電話及電視機就可接取網際網路的所有資訊服務。

有線電視在台灣是一項新興的高科技寬頻傳播媒體。根據統計台灣已有超過百分之七十的住戶已安裝有線電視服務。過去第四台因陋就簡的技術及管理模式在有線電視法及有線電視技術規範下，未來有線電視將發展成雙向互動的寬頻服務網路。許多關鍵的寬頻互動網路技術，例如：頭端的視訊伺服器(Video Server)或用戶端的視訊隨選機(set-top Box)與有線電視數據機(Cable Modem)都正在熱烈地開發及試用中。但是，除了硬體技術以外，有更多人關心有那些雙向互動的服務能吸引有線電視訂戶花錢購買。截至目前為止，利用有線電視網路提供網際網路的線上服務(Internet On-Line Service)是最確切的服務項目之一。根據美國最大的有線電視公司—TCI 公司命名@HOME 的互動服務系統實驗，目前 TCI 在其最新雙向互動有線電視網路上提供網際網路線上服務，依各訂戶使用情形每月可向每位訂戶收取美金 30 元至 50 元，這項數據服務費用可說是有線電視業者最新最確定的一項財源。雖然 TCI 是使用真正的有線電視雙向網路可提供多數訂戶同時上網

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五、發明說明 (3)

際網路的服務，而本系統則是以最經濟實惠的方式藉由電話網路作為選擇信號的路徑，且一次只允許一位訂戶使用本系統；但是，本系統在扮演教育訂戶、及推廣網際網路服務的功效上是非常顯著而明確的。

在網際網路的眾多效益中，促銷廣告是非常重要的一項。若善用有線電視的寬頻多頻道特性，可專為本系統開闢網際網路頻道，除了隨時接受訂戶的撥接上網服務，更可以充分利用頻道空間時間安排網際網路的教學應用及工商廣告；甚至於可提供專屬的地區性有線電視網際網路佈告欄讓所有訂戶共享一個研討網際網路的專屬天地。

綜合上述可知，本系統發明背景很堅實，而發明動機也很明確。在現代人終將高度需要網際網路的此時，本系統以最經濟實惠的方式滿足大眾認識及學習網際網路的需求，同時也提供有線電視業者一個新的服務項目和一個待開發的潛在金礦。身為有線電視經營者的我們，對本系統的功能及應用都深具信心，對於如何善用本系統所可能為公司帶來的效益更是充滿著迫切的期待。

2. 詳細說明

為使貴審查委員瞭解本發明之特徵及產業利用價值，茲藉由具體之實施例，配合所附之圖示對本發明作一詳細說明，說明如后：

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五、發明說明 (4)

圖式說明：

第一圖係為本發明電話遙控有線電視網際網路系統架構圖。

第二圖係為本發明之信號轉換機功能方塊圖。

第三圖係為本發明之複頻雙音解碼器功能方塊圖。

第一表係為本發明之信號轉換對照表。

第四圖係為本發明之微處理器內部程式流程圖。

第五圖係為本發明之系統應用架構圖。

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請參閱第一圖，係本發明電話遙控有線電視網際網路系統的系統架構圖，如圖所示：主要係包括用戶端的電話機(11)及電視機(13)，傳輸網路部份的電話網路(14)和有線電視網路(15)以及有線電視頭端的網際網路主機(16)、節目切換器(1D)、其他節目源(1C)、調變設備及混波器(1F)等。

在詳細說明本系統如何運作之前，我們先依第一圖的各元件或電路做扼要的解釋如下：

用戶端：指有線電視訂戶的住所。

傳輸網路：泛指將電氣信號由甲地傳至乙地的相關設備。電話網路及有線電視分配線網路都是一種傳輸網路。

有線電視頭端：指接收、處理、傳送有線電視信號或有

五、發明說明 (5)

線廣播信號並將其播送至分配線網路之設備及其所在之場所。

電話機(11)：指一般民眾使用之按鍵式電話機

選台器(12)：是一種改變信號頻率的電路設備，在舊式非全頻道的電視機其電視機的接收頻帶為第13頻道，而選台器的主要功能即是將許多有線電視頻道節目中的任一頻道轉換成第13頻道之頻率以供電視接收。對現今先進的全頻道電視已毋需安裝選台器了。

電視機(13)：指一般家用電視機，在本系統中它被兼用為顯示網際網路的資訊畫面。

電話網路(14)：指一般撥接式電話交換網路，提供點對點的語音通信。在本系統訂戶用電話按鍵產生的操作網際網路主機之控制信號是藉由電話網路傳送至頭端主機。

有線電視分配線網路(15)：指連接頭端至訂戶間之纜線網路及設備。在本系統，此分配線網路用來傳送網際網路主機的畫面資訊至訂戶家中的電視機。

網際網路主機(16)：是一部工業級PC再加上信號轉換機(17)、視訊重疊卡(19)以及電話數據機(1A)等周邊電路設備。其主要功能是為有

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五、發明說明 (6)

線電視訂戶連接上網際網路，並且將顯示在 PC 顯像器上的網際網路畫面送至節目切換器，再經調變器及混波器後由有線電視網路傳送至訂戶的電視機螢幕上。

信號轉換機(17)：是一個信號轉換電路，它可將訂戶由電話按鍵選擇的信號轉成電腦能識別的鍵盤信號或滑鼠信號。因此，訂戶可以在家中遙控網際網路主機，並且上網遨遊。

工業級 PC(18)：是一部功能較強，穩定性及可靠性較佳的個人電腦。為了考慮全年無休的操作必須採用規格較佳的個人電腦。此外為了日後周邊電路的擴充方便性，此工業級 PC 的擴充槽也比一般 PC 多四個槽。

視訊重疊卡(19)：是一片電路卡，它能將電腦的影像畫面轉成一般電視系統所通用的影像訊號。

數據機(1A)：此為一般的電話數據機。目前其最快之傳輸速率為 28800bps。它是網際網路主機連接網際網路的主要傳輸介面設備。

網際網路服務(1B)：網際網路(Internet)是一個龐大的網

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五、發明說明 (7)

路綜合體，遍及世界各地，提供數不盡且有用的即時資訊服務。通常，藉由電腦、數據機及電話網路的連結，任何人都可以上網分享網際網路上的資訊服務。

其他節目源(1C)：指錄放影機、碟影機或影像伺服器等播放設備，它們可以提供相關的電視節目。

節目切換器(1D)：是一個視訊切換器，它可在許多輸入之節目中，選擇一個節目並將之輸出至調變設備。

調變設備(1E)：是一個將基頻電視信號調變至射頻載波上的設備。選擇適當頻道的調變器或可調式調變器，可將我們想要的節目訊號播放至網路網路的專屬頻道上。

混波器(1F)：是一個射頻信號組合裝置。它可將許多調變器的輸出信號混合成寬頻帶(例如54~550MHz 頻帶)的有線電視訊號，再經由有線電視網路播送至所有訂戶家中。

在介紹完第一圖的各部電路功能後，我們以實例信號流程說明第一圖的整體運作情形。訂戶在家中觀看有線電視網際網路頻道的節目，若此時正好有別的訂戶在使用頭端的網際網路主機，則必須等候或者觀摩別人上

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五、發明說明 (8)

網的情形。當頭端的主機空閒時，訂戶撥通上網專線經由電話網路將訂戶與頭端主機連線，此時主機會將操作指示畫面，廣播至所有訂戶。此正在操作之訂戶依照其電視機畫面的指示，以電話機之按鍵操縱電視上的滑鼠游標做上網之選擇。上網成功後，訂戶就以同樣的方式，使用電話按鍵配合電視機畫面，享用網際網路的各項服務。

若頭端僅提供一部網際網路主機，那麼同時只允許一人操作，其他觀眾都只能觀摩學習。在稍後第五圖系統應用架構說明時，我們將介紹多人同時使用之情形。

請參閱第二圖，係本發明中將電話信號轉為電腦可辨認信號的信號轉換機之功能方塊圖。基本上，在本發明中的信號轉換機是將電話按鍵所產生的雙音複頻信號轉換成一般個人電腦通用的鍵盤或滑鼠之輸入信號型式。我們先介紹各部電路再做整體說明。

電源電路(21)：指信號轉換機的電源供應電路，它的輸入電壓是交流 110 伏特，而輸出電壓則為三種直流電壓、+5 伏特及 +/-12 伏特。

電話網路介面(22)：係連接信號轉換機與電話線的介面電路，它將一般電話電路的電氣特性轉為複頻雙音解碼器(23)可接受的型式。

複頻雙音解碼器(23)：係信號轉換機的關鍵電路之一，

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它將類比的複頻雙音電話按鍵信號轉換成數位型式的編碼信號，其詳細編碼對照表可參閱第一表。

微處理器(24)：係信號轉換機的控制中心。依照使用者選擇的鍵盤或滑鼠模式。微處理器可將複頻雙音解碼器的解碼結果轉換成鍵盤碼格式或滑鼠信號格式。

鍵盤/滑鼠選擇(25)：是一個選擇開關，依不同的應用例，用戶可選擇將電話按鍵信號轉為電腦鍵盤信號或滑鼠信號。

鍵盤介面(26)：將微處理器送來之鍵盤碼，轉為個人電腦所相容的標準鍵盤電氣信號。

RS-232 串列埠介面(27)：將微處理送來的滑鼠信號碼轉為個人電腦所相容的 RS-232 串列埠介面電氣信號。

訊息顯示介面(28)：指 LED 顯示介面，用來顯示信號轉換機的運作狀態。

鍵盤連接器(29)：係連接電腦之鍵盤輸入插座之裝置。

滑鼠連接器(2A)：係連接電腦之滑鼠輸入插座之裝置。

綜合以上各部電腦之說明可知，信號轉換機係將訂戶的電話按鍵信號由電話網路傳送至信號轉換機的電

五、發明說明 (10)

話網路介面電路，再經過複頻雙音解碼器解碼成為一組4位元的二進位碼，此二進位碼再依用戶選擇鍵盤或滑鼠輸入模式，由微處理器轉換成電腦鍵盤格式碼或電腦滑鼠格式碼，最後以完全相容之模擬信號作為個人電腦的鍵盤輸入或滑鼠輸入。

請參閱第三圖，複頻雙音解碼器的主要功能是將電話按鍵所產生的類比複頻訊號轉換成四位元的二進位碼。市面上已有許多半導體公司生產這種電路的積體電路(IC)，直接選購複頻雙音解碼器 IC 是最經濟而可靠的做法。由第三圖所示的功能方塊圖可知，電話線由 IN+ 及 IN- 的接腳輸入，先經撥號音頻濾波器(31)將撥號音濾掉，而複頻雙音訊號則分別由高音頻群組濾波器(32)及低音頻群組濾波器(33)取出，再經由數位偵測演算邏輯(34)及轉和鎖碼換關器(35)將類比音頻信號轉為數位信號由 $Q_1Q_2Q_3Q_4$ (36)來表示四位元的二進位碼。此二進位碼將傳給微處理器作為轉換電腦鍵盤碼或滑鼠信號碼的主要依據。

請參閱第一表，係本系統相關信號轉換的對照表。訂戶按電話按鍵數字產生對應之高頻及低頻的複頻雙音信號，例如按電話按鍵”1”則是輸出 697Hz 及 1209Hz 組成的複頻雙音信號。此複頻信號經由複頻雙音解碼器解碼成 $Q_1Q_2Q_3Q_4=0001$ 的 4 位元二進制碼，而微處理機再依此二進制碼轉換成電腦鍵盤的 ESC 信號，若選

(請先閱讀背面之注意事項再填寫本頁)

五、發明說明 (11)

擇滑鼠模式則電話按鍵"1"並不代表任何意義。再舉電話按鍵"3"為例，它由 697Hz 及 1477Hz 組成，而被解碼為 $Q_1Q_2Q_3Q_4=0011$ 在鍵盤模式代表 PGUP，在滑鼠模式代表滑鼠右鍵。

請參閱第四圖，係本發明之信號轉換機的微處理機內部程式流程圖。在此流程圖的第(3)步驟會決定鍵盤模式或滑鼠模式。在第(6)步驟開始處理及判斷所收到的電話按鍵音，在等候接受按鍵音時 LED 閃爍表示系統正常操作中。在第(7)步驟判斷出電話按鍵音所代表的數字，再依照第(3)步驟所選擇的模式進入步驟(9)或步驟(10)~(12)當轉換完成一個電話按鍵音後回到步驟(13)的 A 位置，再繼續接收下一個按鍵音。通常，選擇鍵盤或滑鼠是由外部開關設定的，因此，整個程式的主要運作是在步驟(6)至步驟(13)。

請參閱圖(五)，係本發明的系統應用架構圖，在第一圖已說明了本發明的系統架構，但那是針對頭端僅提供一部網際網路主機的情形。在實際應用本發明時，有線電視業者可依當地的需求，設置一部以上的網際網路主機。目前，已有許多有線電視系統的新建網路其系統頻寬為 750MHz，其中 550MHz 至 750MHz 的頻寬暫時保留未用。在國內數據電信業務開放給有線電視業者經營的法令通過以前，這 200MHz 的頻寬可能會閒置一段時間。若將本發明用於此 200MHz 頻寬中必能在最短時

(請先閱讀背面之注意事項再填寫本頁)

五、發明說明 (12)

間內將網際網路的理念與應用充分推廣，在全民資訊以及國家資訊基礎建設上獲至重大成效。

在第五圖中，若有線電視業者在頭端設置 N 部網際網路主機，並提供 N 個網際網路頻道之調變設備，則至多可允許 N 個用戶同時使用有線電視的上網服務。為了方便用戶記憶撥接網際網路服務之專線號碼，系統業者可以用總機代表號作為撥接上網號碼而以各分機號碼來對應各頻道的網際網路主機編號。

(請先閱讀背面之注意事項再填寫本頁)

86年6月14日 修正
補充

(請先閱讀背面之注意事項再填寫本頁)

六、申請專利範圍

1. 一種電話遙控有線電視網路系統，主要係包括一按鍵電話、一選台器、一電視機、一網際網路主機（包括信號轉換器、工業級 PC、視訊重疊卡、數據機）、一節目切換器、一組調變設備及與電話網路和有線電視分配線網路配合，有線電視的訂戶以按鍵式電話機之按鍵模擬電腦鍵盤或電腦滑鼠的功能，藉由公眾電話網路傳送控制信號給位於有線電視頭端的網際網路主機，而達到遙控網際網路主機的效果，至於該網際網路主機的顯像器畫面訊號則是經過頭端的調變處理後，由有線電視分配線網路傳送至訂戶端並顯示於訂戶的電視機上；所以訂戶能依該電視畫面上的指示，用電話按鍵操控遠在頭端網際網路主機，而能擷取全球的往際網路資源。
2. 如申請範圍第 1 項所述之電話遙控有線電視網際網路系統，其中，該網際網路主機之信號轉換機將電話按鍵信號轉換成電腦鍵盤信號或電腦滑鼠信號；依不同的應用可選擇鍵盤模式或滑鼠模式，以得到適當的轉換信號來操控電腦。

86年(月)日 修正
補充

A9
B9
C9
D9

圖式

修正請委員會
本有無變更實質
內容是否准予修正
之

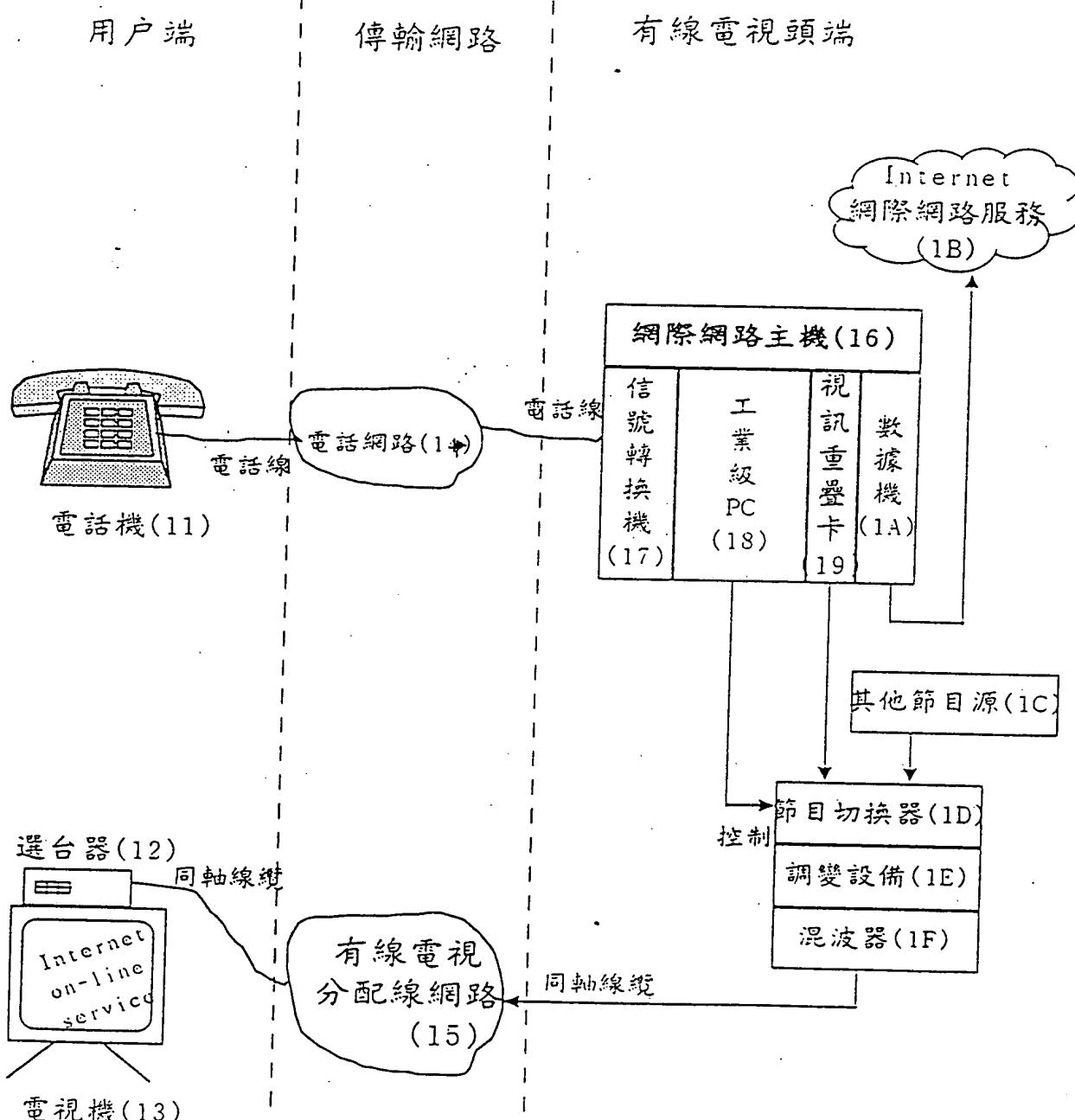
(請先認真背誦之注意事項再行繪製)

低頻	高頻	按鍵 數字	啓動 輸出	Q4	Q3	Q2	Q1	鍵盤模式	滑鼠模式
697	1209	1	H	0	0	0	1	ESC	未使用
697	1336	2	H	0	0	1	0	上移	上移
697	1477	3	H	0	0	1	1	PGUP	滑鼠右鍵
770	1209	4	H	0	1	0	0	左移	左移
770	1336	5	H	0	1	0	1	F1	未使用
770	1477	6	H	0	1	1	0	右移	右移
852	1209	7	H	0	1	1	1	F2	未使用
852	1336	8	H	1	0	0	0	下移	下移
852	1477	9	H	1	0	0	1	PGDN	滑鼠中鍵
941	1209	0	H	1	0	1	0	F3	未使用
941	1336	*	H	1	0	1	1	ESC	未使用
941	1477	#	H	1	1	0	0	ENTER	滑鼠左鍵
697	1633	A	H	1	1	0	1	電話未用	
770	1633	B	H	1	1	1	0		
852	1633	C	H	1	1	1	1		
941	1633	D	H	0	0	0	0		
-	-	ANY	L	Z	Z	Z	Z		

(第一表 信號轉換對照表)

圖式

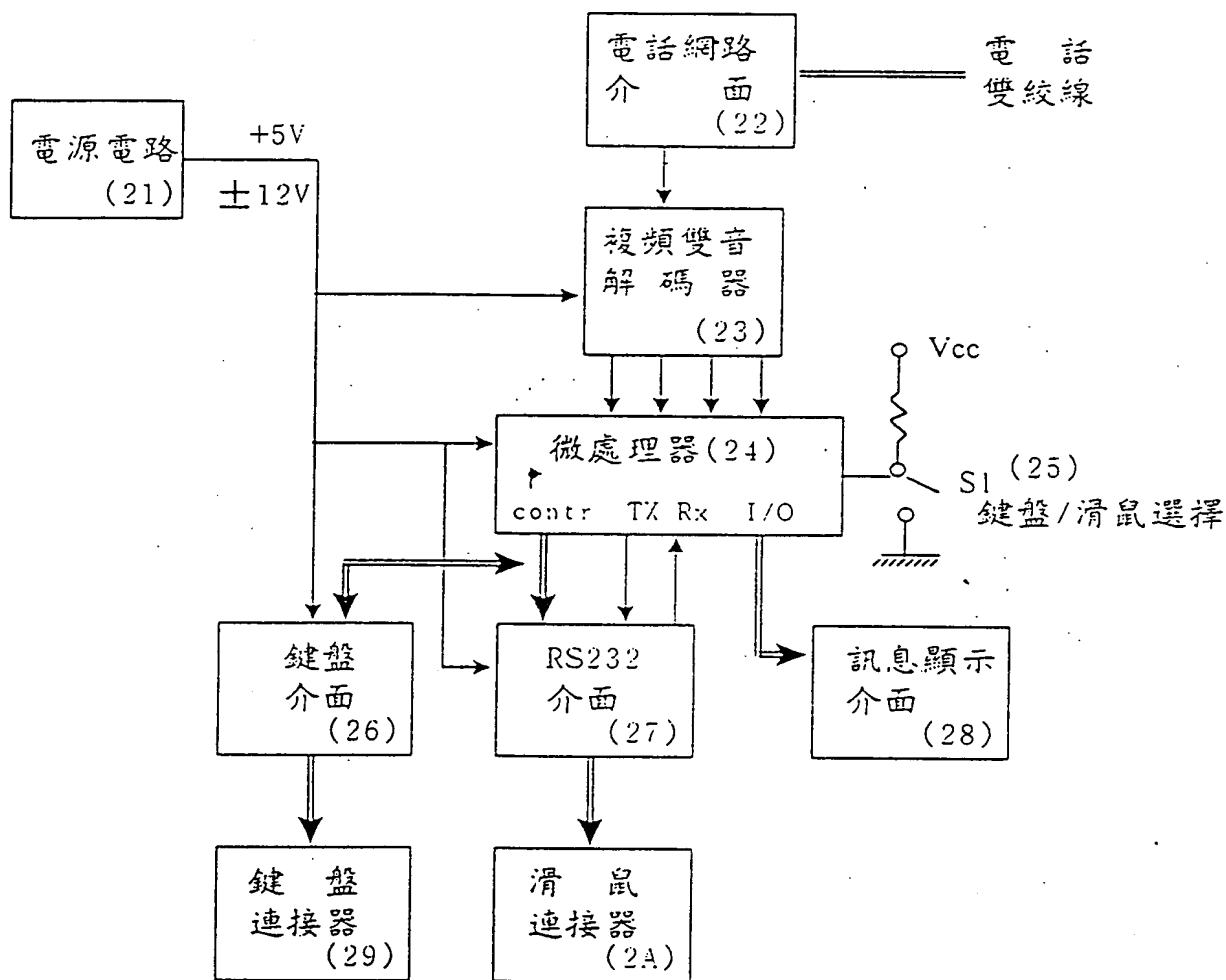
(請參照背面之任意事項進行裁剪)



(第一圖 電話遙控有線電視國際網路系統架構圖)

圖式

(請參照背面之注意事項進行操作)



(第二圖 信號轉換機功能方塊圖)

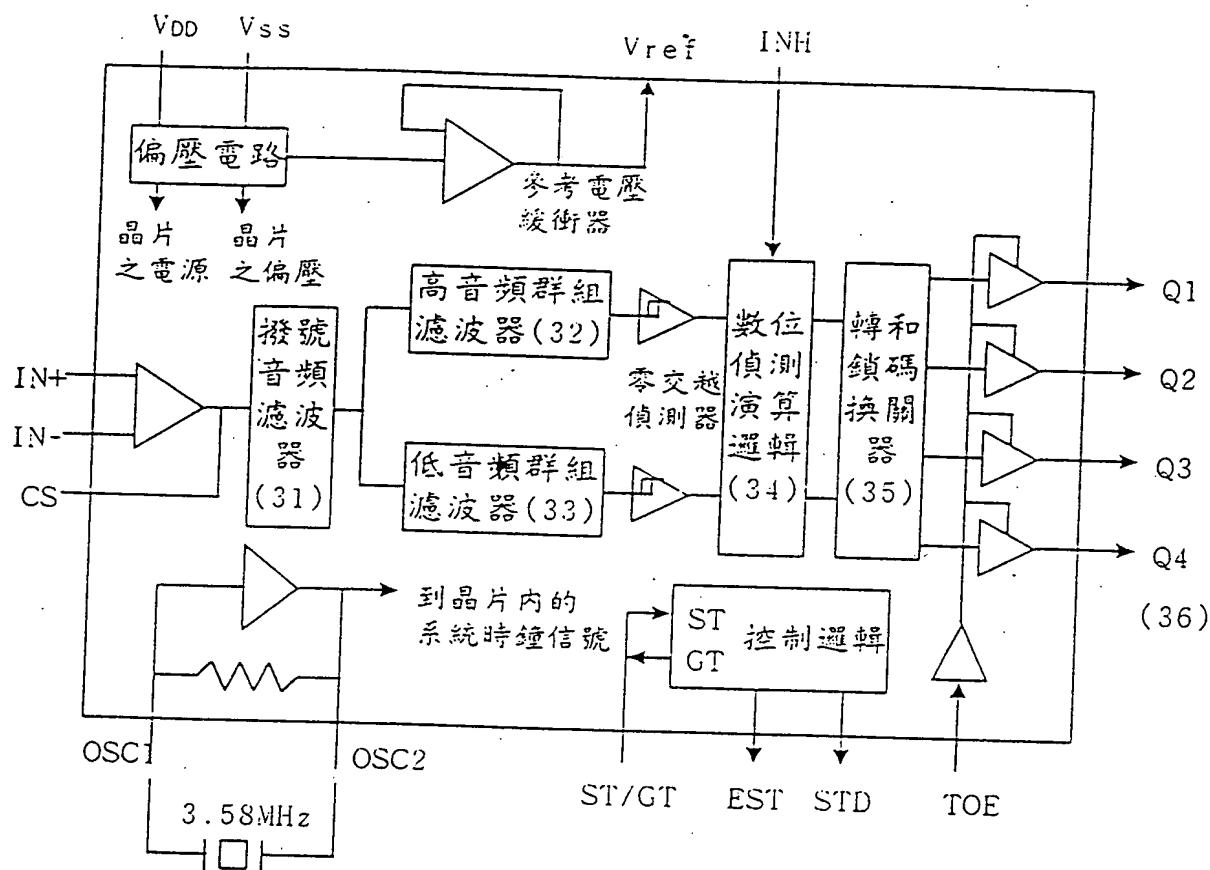
3.37(27)日修正
補充

A9
B9
C9
D9

圖式

(請先閱讀背面之注意事項並行繪製)

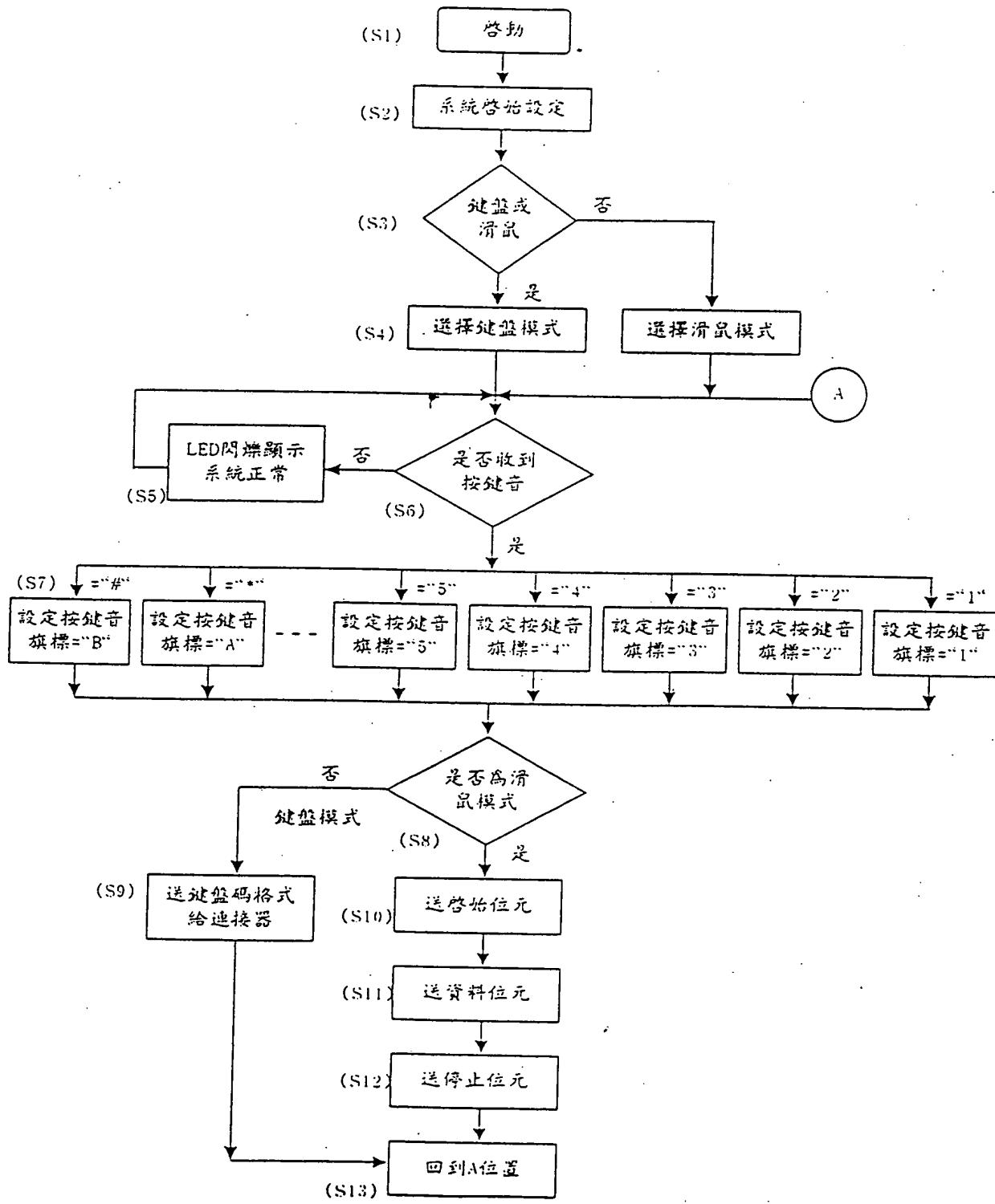
煩請委員明示
修正本有無變更實質內容未
86年1月21日所提之
准予修正。



(第三圖 複頻雙音解碼器功能方塊圖)

圖式

(請先閱讀背面之注意事項再行繪製)



(第四圖 微處理器內部流程圖)

圖式

用戶端

傳輸網路

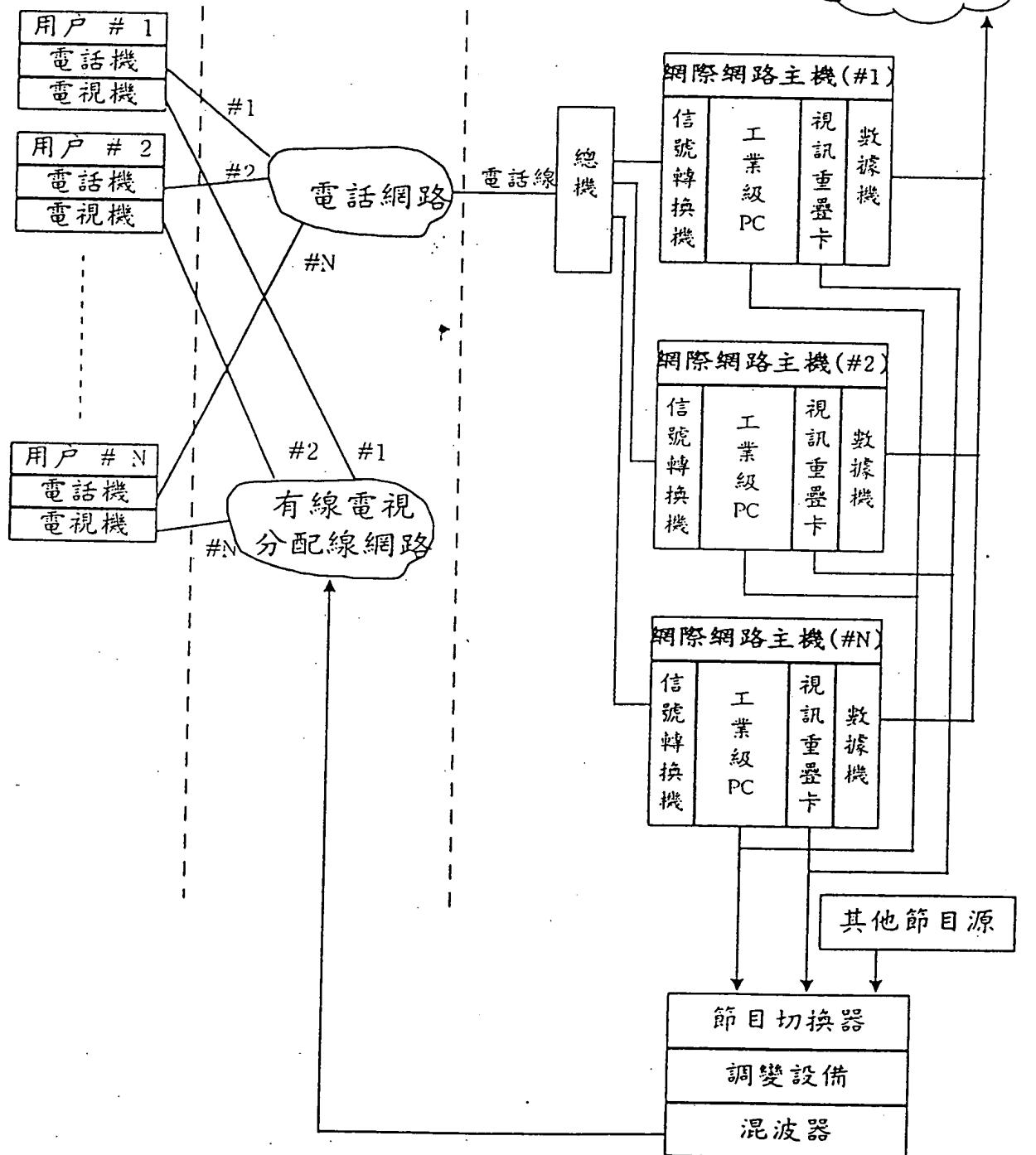
有線電視頭端

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(第五圖 系統應用架構圖)

1

TITLE: TELEPHONE REMOTE-CONTROLLED CABLE TELEVISION
INTERNET SYSTEM

ABSTRACT

5 A telephone remote-controlled cable television internet, mainly use of push-buttons of a push button-type telephone at a cable television subscriber's end to simulate functions of a computer mouse or a computer keyboard to remote-control via the telephone network
10 an Internet main unit at a cable television provider's end so as to acquire Internet resources around the world. Display screen signals of the Internet main unit are modulated at the cable television provider's end and are transmitted via a cable television network to the
15 subscriber's television set. If a cable television company has this system installed, subscribers of that company will only have to use his telephone and television sets to enjoy the global information service on the Internet in the same way as using personal
20 computer equipment and modems.

1. BACKGROUND OF THE INVENTION

25 The Internet was the hottest topic in the global information world last year. A large number of information experts believe that the Internet will be the catalyst for the global information highway. At present, the Internet is regarded as the most inexpensive way for developing countries to access the

global information system. However, due to telecommunications monopoly policies and opposition by some governments, the Internet is still quite costly or unable to penetrate into some districts. According 5 to estimates, at present, a total of three million computer systems in over 146 countries around the world can receive the data retrieval services provided by the Internet every day. There are over 31 million Internet users, and the number is increasing at an astonishing 10 speed.

We, living in the twentieth century, absolutely cannot avoid the influences of the Internet. From education, academic research, shopping, entertainment, travel, traffic, finance, arts, news, to 15 telecommunications, excellent convenience and practicality can be achieved through Internet access. Regrettably, although modern people have seen an Internet page, heard about Internet news, and talked about Internet topics, most of them do not have the 20 experience of accessing the Internet to see what it really is. This is because one must have some basic equipment in order to access the Internet. Apart from applying for an Internet account, one needs to have hardware equipment, such as a personal computer and a 25 modem. In addition, it requires an expert's guidance in order to learn to operate the Internet as one wishes.

An important fact is that most people will not spend

a budget of from fifty thousand to one hundred thousand (NT) dollars to buy an Internet-ready computer and related equipment in order to have a glimpse of the charms of the Internet. This is the major reason why
5 the number of Internet users in a country is large where the number of personal computers is also large. In other words, the development of the Internet is certainly restrained by the popularity of personal computers. Fortunately, the present invention aims to
10 overcome such restraint. Ordinary people, as long as they are cable television subscribers, can use their telephone and television sets at home to connect to and retrieve all the information services of the Internet without the need to buy a personal computer.

15 Cable television service in Taiwan is a newly developed high-tech wideband broadcasting medium. According to statistics, over 70% of the residences have cable television services. In the past, cable television service providers made do with what was
20 available in terms of techniques and modes of management. With the implementation of the Cable Television Law and cable television technical regulations, cable television will develop into a two-way interactive broadband service network in the
25 future. Many key broadband interactive network techniques, for instance, video servers at the provider's end or set top boxes and cable modems at the

end-user's end, are being aggressively developed and tested. However, other than hardware techniques, many more people care about the kinds of two-way interactive services that can attract cable television subscribers 5 to spend money thereon. Up to the present, using the cable television network to provide Internet on-line service is one of the most practical service items. According to the interactive service system experiment named @HOME by the largest cable television company in 10 the United States, TCI, the Internet on-line service now provided thereby on its latest two-way interactive cable television network can collect from US\$30 to US\$50 from each subscriber depending on the subscriber's use conditions. Such data service fees 15 can be said to be the latest and the most certain source of income for cable television service providers. Despite the facts that TCI employs a true cable television two-way network to provide service for a plurality of subscribers to access the Internet, and 20 that the system of the present invention, by using the telephone network as a path for signal selection, only permits subscribers to use the system one at a time in the most economical way, the effects of the role played by the system of the present invention in educating 25 subscribers and promoting Internet services are very outstanding and clear.

Of the numerous benefits provided by the Internet,

promotional advertisements are a very important item. If the broadband and multi-channel features of cable television are to be used properly, an Internet channel exclusive for the system of the present invention can 5 be opened so that, aside from providing subscribers with dial-up links to the Internet, the system of the present invention can make the best use of free channel time for Internet instruction and application classes as well as commercials. A bulletin board exclusive for 10 a regional cable television network can even be available for subscribers to share an exclusive world of Internet discussions.

To sum up the aforesaid, the background of the system of the present invention is very strong, and the objects 15 of the present invention are clear. At this time when modern people are in great need of the Internet, the system of the present invention meets the public's demand to know and learn to use the Internet in the most economical and cost-effective way, while providing the 20 cable television servers with a new service item and a hidden gold mine ready to be explored. We, in the cable television business, have complete confidence in the functions and applications of the system of the present invention, and are full of expectations for the 25 benefits proper use of the system of the present invention will bring.

2. DETAILED DESCRIPTION OF THE INVENTION

In order to enable the Examiner to appreciate the features and industrial utility of the present invention, the present invention will be described in detail as follows by way of concrete examples with reference to the accompanying drawings:

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is diagram illustrating the architecture of a telephone remote-controlled cable television Internet system of the present invention.

Figure 2 is a functional block diagram of a signal converter of the present invention.

Figure 3 is a functional block diagram of a multi-frequency dual-tone decoder of the present invention.

Table 1 is a signal conversion look-up table of the present invention.

Figure 4 is a flowchart of an internal program of a microprocessor of the present invention.

Figure 5 is a diagram illustrating the application architecture of the system of the present invention.

Reference is made to Figure 1, which is a system architecture diagram of the telephone remote-controlled cable television internet system. As shown, the present invention mainly includes a telephone set

11 and a television set 13 at a subscriber's end, a telephone network 14 and a cable television network 15 of a transmission network portion, and an Internet main unit 16, a program switching device 1D, other program sources 1C, modulator devices and mixers 1F at 5 a cable television provider's end.

Before giving a detailed description of the operation of the system of the present invention, we first of all explain briefly the elements and circuits 10 shown in Figure 1 as follows:

Subscriber's end: This term refers to the residence of a cable television subscriber.

Transmission network: This term broadly refers to transmission of electrical signals from relevant 15 equipment in one place to that in another. Telephone networks and cable television distribution networks are examples of the transmission network.

Cable television provider's end: This term refers to equipment for receiving, processing, and transmitting 20 cable television signals or cable broadcast signals for broadcasting to the distribution network, and location of the equipment.

Telephone set 11: This term refers to push button-type telephones widely used by the public.

25 Channel selector 12: This is a circuit device for altering signal frequencies. For old television models that do not offer a full-channel selection, the

receiving channel is Channel 13. The major function of the channel selector is to convert any one of the many cable television program channels into the frequency of Channel 13 for television reception. For 5 the advanced full-channel televisions of today, there is no need for a channel selector.

Television set 13: This term refers to a television set used in the home. In the system of the present invention, it is also used as a screen for displaying Internet 10 information.

Telephone network 14: This term refers to the ordinary dial-type telephone switching network, which provides point-to-point voice communications. In the system of the present invention, control signals to operate the 15 Internet main unit as generated by the subscriber's operation of the telephone push buttons are transmitted via the telephone network to the main unit at the provider's end.

Cable television distribution network 15: This term 20 refers to a cable network and equipment connecting the provider's end with the subscriber. In the system of the present invention, the distribution network is used to transmit screen information of the Internet main unit to the television set in the subscriber's home. 25 Internet main unit 16: This is an industry-grade PC plus peripheral circuit equipment, including a signal converter 17, a video signal overlay card 19, and a

telephone modem 1A. Its major function is to connect the cable television subscriber to the Internet, and to send the Internet screen displayed on the PC's monitor to the program switching device and to the modulator and the mixer to be further transmitted via the cable television network to the subscriber's television screen.

Signal converter 17: This is a signal conversion circuit that can convert signals selected by the subscriber via the telephone push buttons into computer-identifiable keyboard signals or mouse signals. Therefore, the subscriber can remote-control the Internet main unit at home to surf the Web.

Industry-grade PC 18: This is a personal computer with relatively powerful functions and good stability and reliability. In consideration of all-year-round operation, personal computers of preferred specifications should be adopted. In addition, for the sake of facilitating expansion of peripheral circuits in the days to come, this industry-grade PC should have four more expansion slots than ordinary PCs.

Video signal overlay card 19: This is a circuit card that can convert computer images into image signals used for ordinary television systems.

Modem 1A: This is an ordinary telephone modem. At present, the highest speed of transmission is 28800bps. It is a major piece of transmission interface equipment

for connecting the Internet main unit with the Internet.

5 Internet service 1B: The Internet is a huge collective body of networks that extends to all parts of the world, and that provides innumerable and useful real time information services. As a general rule, through the connection of computers, modems and telephone networks, anybody can log on to share the information services available on the Internet.

10 Other program sources 1C: This term refers to broadcasting equipment, such video recorders and players, laser disk players, or image servers. They can provide relevant television programs.

15 Program switching device 1D: This is a video signal switching device that can select, from among many input programs, one program to be outputted to the modulation device.

20 Modulation device 1E: This is a device for modulating a base frequency television signal to an emission frequency carrier. A suitable channel modulator or an adjustable modulator can be selected to broadcast desired program signals to a channel exclusive to the Internet.

25 Mixer 1F: This is an emission frequency signal combining device that can mix signals outputted by many modulators into broadband (e.g., 54-550 MHz bands) cable television signals, which are subsequently

11
broadcast via the cable television network to the homes of all the subscribers.

After giving an overview of the functions of the circuits in each portion as shown in Figure 1, we will 5 now describe the overall operation in Figure 1 by way of an exemplary signal flowchart. A subscriber is watching a program on the cable television Internet channel. If another subscriber is using the Internet main unit at the provider's end, the subscriber must 10 wait or observe how another subscriber accesses the Internet. When the main unit at the provider's end is free, the subscriber dials a log-in dedicated line to connect to the main unit at the provider's end via the telephone network.¹ At this time, the main unit will 15 broadcast the operating instructions indicating screen to all the subscribers. The subscriber who is carrying out the operation follows the instructions on the television screen to control the cursor on the television set using the push buttons of the telephone to make on-line selections. After making a successful 20 hook-up, the subscriber can use the push buttons on the telephone in conjunction with the television screen in the same manner to enjoy the services available on the Internet.

25 If the provider's end provides only one Internet main unit, only one subscriber is permitted to operate. Other viewers can just watch and learn. In the

description of the application architecture of the system of Figure 5 to be set forth hereinafter, we will introduce the situation in which multiple subscribers are permitted to operate at the same time.

5 Reference is made to Figure 2, which is a functional block diagram of the signal converter of the present invention for converting telephone signals into computer-identifiable signals. Basically, the signal converter of the present invention is provided to convert dual-tone multi-frequency signals generated via the push buttons of the telephone set into input signals associated with a keyboard or mouse of an ordinary personal computer. We will give an introduction to the circuits before describing them in greater detail.

10

15

Power supply circuit 21: This refers to a power supply circuit of the signal converter. It has an input voltage of AC 100 volts, and three output voltages of DC +5 volts and +/-12 volts.

20 Telephone network interface 22: This connects the signal converter with the telephone line's interface circuit. It converts electrical characteristics of ordinary telephone circuits into a format acceptable by the multi-frequency dual-tone decoder 23.

25 Multi-frequency dual-tone decoder 23: This is one of the key circuits of the signal converter, and converts analog multi-frequency dual-tone telephone push button

signals into digital encoded signals. A detailed coding look-up table is shown in Table 1.

Microprocessor 24: This is the control center of the signal converter. Depending on whether the keyboard mode or mouse mode is selected by the user, the microprocessor can convert decoded results from the multi-frequency dual-tone decoder into a keyboard code format or mouse signal format.

Keyboard/Mouse selector 25: This is a select switch.

Depending on different application cases, the subscriber can opt to convert telephone push button signals into computer keyboard signals or mouse signals.

Keyboard interface 26: This converts keyboard codes delivered from the microprocessor into standard keyboard electrical signals compatible with personal computers.

RS-232 serial port interface 27: This converts mouse signal codes delivered from the microprocessor into

RS-232 serial port interface electrical signals compatible with personal computers.

Signal display interface 28: This term refers to LED display interface, and is used to display the operating state of the signal converter.

Keyboard connector 29: This is a device for connecting with a keyboard input jack of the computer.

Mouse connector 2A: This is a device for connecting with

a mouse input jack of the computer.

From the above description, it can be understood that the signal converter transmits the telephone push button signals of the subscriber via the telephone network to the telephone network interface circuit of the signal converter and further to the multi-frequency dual-tone decoder to be decoded into a binary code of a set of four bits. The binary code, depending on whether the keyboard or mouse input mode was selected by the subscriber, is then converted into a computer keyboard format code or computer mouse format code which, finally, becomes a compatible simulated keyboard input or mouse input of the personal computer.

Referring to Figure 3, the major function of the multi-frequency dual-tone decoder is to convert the analog multi-frequency signal generated via the telephone push buttons into a binary code of four bits. Many semiconductor companies manufacture integrated circuits (IC) of this type that are presently available on the market. The most economical and reliable way is to purchase such multi-frequency dual-tone decoder ICs directly. It can be seen from the functional block diagram shown in Figure 3 that the telephone line is inputted via the legs IN+ and IN-. The dialling tone is filtered via a dialling tone-frequency filter 31. The multi-frequency dual-tone signal is retrieved from a high-frequency group filter 32 and a low-frequency

group filter 33, respectively. The analog sound frequency signal is converted by a digital detecting algorithm logic 34 and a converting and locking coding device 35 into a digital signal of $Q_1Q_2Q_3Q_4$ (36) to represent a four-bit binary code. The binary code will be delivered to the microprocessor to serve as a main basis for conversion of computer keyboard codes or mouse signal codes.

Reference is made to Table 1, which is a look-up table of relevant signal conversion in the system of the present invention. The subscriber depresses a numbered push button of the telephone set to generate a corresponding high-frequency and low-frequency multi-frequency dual-tone signal. For instance, if the numeric key "1" is depressed, a multi-frequency dual-tone signal of 697Hz and 1209Hz will be outputted. The multi-frequency signal is decoded by the multi-frequency dual-tone decoder into a four-bit binary code of $Q_1Q_2Q_3Q_4=0001$. The microprocessor then converts the binary code into an ESC signal of the computer keyboard. If the mouse mode is selected, depressing the numeric key "1" does not have any significance. Take the numeric key "3" as another instance. It is composed of 697Hz and 1477Hz, and can be decoded into $Q_1Q_2Q_3Q_4=0011$, which corresponds to PGUP in the keyboard mode or the left key in the mouse mode.

Reference is made to Figure 4, which is a flowchart

of the internal program of the microprocessor of the signal converter according to the present invention. In step (3) of the flowchart, a selection of the keyboard mode or mouse mode is made. In step (6), processing and determination of the received tone of the push button commences. The LED flashes to indicate that the system's operation is normal while awaiting receipt of the tone of the push button. In step (7), the number represented by the tone of the push button is determined. Then, according to the mode selected in step (3), step (9) or steps (10) to (12) are proceeded with. After completion of conversion of the tone of one push button, the flow then proceeds to position A in step (13) before continuing with the receipt of the next push button tone. In general, keyboard or mouse selection is made via an external switch. Therefore, the major operation of the whole program is in steps (6) through step (13).

Reference is made to Figure 5, which illustrates the application architecture of the system of the present invention. The architecture of the system of the present invention has been described with reference to Figure 1. However, the description is directed to the situation in which only one Internet main unit is provided at the provider's end. In reducing the present invention to practice, cable television service providers may, based on their local demands, set up more than one Internet main unit. At present,

many of the newly established networks of the cable television systems have a system bandwidth of 750MHz, with bandwidths of 550MHz to 750 MHz remaining unused for the time being. Before the passage of the law to 5 allow cable television service providers to run a local digital telecommunication service, the 200MHz bandwidth may remain idle for a period of time. If the present invention could be employed in this 200MHz bandwidth, it certainly would promote extensively the 10 concept and applications of the Internet within the shortest time, and make important achievements in the fundamental construction of all-people information and national information.

As shown in Figure 5, if the cable television service 15 provider sets up N Internet main units and provide modulation devices of N Internet channels, up to N subscribers can simultaneously use the Internet service via cable television. In order to facilitate subscribers to remember dedicated line numbers for 20 hooking-up to the Internet service, system providers may use the telephone number of a trunk telephone as the dial-up number with extension numbers corresponding to the serial numbers of the Internet main units of the respective channels.

CLAIMS:

1. A telephone remote-controlled cable television internet system cooperating with a cable television distribution line network and a telephone network, mainly comprising a push button-type telephone, a channel selector, a television set, a Internet main unit (including a signal converter, an industry-grade PC, a video signal overlay card, and a modem), a program switching device, and a modulation device, a cable television subscriber simulating functions of a computer keyboard or a computer mouse using push buttons of the push button-type telephone, a public telephone network being used to transmit a control signal to the Internet main unit at a cable television provider's end to achieve remote control of the Internet main unit, a display screen signal of the Internet main unit being modulated at the provider's end before being transmitted via the cable television distribution line network to the subscriber's end for display on the subscriber's television, so that the subscriber, following instructions on the television screen, can use the push buttons of the telephone to remote-control the Internet main unit at the provider's end to acquire global Internet resources.
2. The telephone remote-controlled cable television internet system as claimed in Claim 1, wherein the

signal converter of the Internet main unit converts telephone push button signals into computer keyboard signals or computer mouse signals, a keyboard mode or a mouse mode being selectable depending on different applications to obtain suitable conversion signals for computer control.

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